INFORMATION TECHNOLOGY

Program of Studies
2014-2015

Learning that works for Kentucky
CTE™

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Kentucky Department of Education

Information Technology

Course Title	Post-Secondary Connection	Valid Course Code	6	7	8	9	10	11	12	Recommended Credit
			Recommended Grade Level						

Course Title	Post-Secondary Connection	Valid Course Code	6	7	8	9	10	11	12	Recommended Credit
Accessing the WAN/Connecting Networks/Cisco IV	CIT 212	110905						X	X	1
Advanced Placement Computer Science A		110701						X	X	1
C++ 1	CIT 142	110202						X	X	1
Computational Thinking	CIT 120	110251				X	X	X	X	1
Computer Graphics (Formerly Digital Graphics Technology)		110213				X	X	X	X	1
Computers, Networks and Databases (Informatics I)	*(INF120)	111001				X				1
Computer Hardware & Software Maintenance	CIT 111	110101				X	X	X	X	1
Computer Literacy	CIT 105	110110				X	X	X	X	1
Databases in the Cloud (Informatics III)	*(CIT 170)	111003					X	X	X	1
Design for the Digital World (Informatics II)	*(INF 128)	111002					X	X	X	1
Developing a Cloud Presence (Informatics IV)		111004						X	X	1
Digital Applications, Texturing & Special Effects (Photoshop)	DGD 131	113602					X	X	X	1
Digital 3D Graphics II – Texturing&Special Effects II	DGD231	113604						X	X	1
Flash with Action Script		110810						X	X	1
GIS Software Tools & Applications	CIT 225	110315					X	X	X	1
Help Desk I: Operations	CIT 232	110102						X	X	1
Home and Small Office Networks	CIT 162	110908					X	X	X	1
Information Technology Co-op	CIT 199	110918						X	X	1
Information Technology Internship	CIT 290	110919						X	X	1
Internet Technologies	CIT 150	110917					X	X	X	1
Introduction to Database Design (Fundamentals)	CIT 170	110211					X	X	X	1
Introduction to Digital 3D Game Graphics	DGD 132	113601				X	X	X	X	1
3D Digital Game Character Development	DGD 232	113603					X	X	X	1
Intro to Routing and Switching	CIT 164	110910						X	X	1
Introduction to GIS - ArcView	CIT 125	110107				X	X	X	X	1
Introduction to Networking Concepts	CIT 160	110901				X	X	X	X	1
JAVA I	CIT 149	110205						X	X	1
JAVA II	CIT 249	110206						X	X	1
JavaScript	CIT 140	110809						X	X	1
LAN Switching and Wireless/Scaling Networks/Cisco III	CIT 209	110904						X	X	1
Leadership Dynamics		110399				X	X	X	X	1

Course	CIT	Code							Value
Microsoft Active Directory Server/Server Infrastructure Admin/Security+Certification	CIT 214	110907					X	X	1
Microsoft Client /Server Config	CIT 213	110913					X	X	1
Network Design and Support	CIT 165	110911					X	X	1
Network Fundamentals: Introduction to Networks Cisco I	CIT 161	110902			X	X	X	X	1
Network Hardware Installation and Troubleshooting	CIT 260	110906					X	X	1
Programming Introduction (e.g., JAVA, C++, Visual Basic)		110201			X	X	X	X	1
Productivity Software	CIT 130	110204			X	X	X	X	1
Routing Protocols and Concepts – Routing and Switching Essentials/ Cisco II	CIT 167	110903				X	X	X	1
Security Fundamentals	CIT 180	110912					X	X	1
Small to Medium Business Networks	CIT 163	110909				X	X	X	1
Special Topics in Computer Science	CIT 299	110752					X	X	1
Special Topics in GIS	CIT 229	110316							
Special Topics in Information Support and Services	CIT 299	110152					X	X	1
Special Topics in Networking	CIT 299	110952					X	X	1
Special Topics in Programming	CIT 299	110252					X	X	1
Special Topics in Web Development & Administration	CIT 299	110852					X	X	1
Visual Basic I	CIT 148	110207					X	X	1
Visual Basic II: Creating Desktop Applications	CIT 248	110208					X	X	1
Web Page Development	CIT 155	110801				X	X	X	1
Web Site Design & Development	CIT 157	110804				X	X	X	1

Information Technology

Overview of Information Technology

Purpose:
The vision of Kentucky Information Technology Education is to promote industry professional development, enhance leadership, provide relevant curriculum vital to the education of all students.

Kentucky Information Technology will:
- Operate as the center for industry standard desktop and communications technology in schools
- Provide a critical link in school to employment or postsecondary education
- Develop stronger relationships with the business community in terms of mutual advocacy, cooperative field experiences, employment placement and support for student organization experiences.
- Represent a necessary component in the education of all students
- Require and promote critical thinking and problem solving
- Offer a flexible curriculum based on standards that adapts to change
- Integrate academic skills into the information technology curriculum in order to insure that students develop excellent written and verbal communication skills, computational skills and scientific problem-solving skills.

Information Technology (IT) is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware.

The "Computer Revolution" has affected all sectors of business. Almost all employers, from the largest manufacturer to the smallest retail store, need IT workers to keep their business operating smoothly. This demand translates into a real shortage of IT workers. According to the Information Technology Association of America, there is a projected gap of more than 800,000 unfilled IT positions this year. This fact makes IT the fastest growing employment opportunity in the nation.

Information Technology Careers prepare individuals to apply technical knowledge and skills in the rapidly growing occupational fields e.g. computer networking, programming, digital media, support services and e-commerce/web design. Information Technology Careers include eight (8) Career Pathways. They are: 1.) Network Administration; 2.) Information & Support Services; 3.) Web Development & Administration; 4.) Computer Programming*; 5.) Informatics; 6.) GIS (Geographic Information Systems); 7.) Computer Science; 8.) Digital Design/Gaming.

Each local school district offering classes in "Computers", "Computer Science", etc. is encouraged to submit a Career & Technical Education "career pathways request form" to the Office of Career & Technical Education, in order to become a part of the IT network of Kentucky schools. The purpose of this effort is to consolidate the many varied computer courses, classes, programs, and etc. under one Career & Technical Education program area. This will enable schools to provide better services to students through an organized, coherent network supported by the Office of Career & Technical Education.

All schools involved in the IT program are recommended to offer a "foundations" course (preferably at the 8th or 9th grade level). Students of Information Technology, regardless of which Career Pathway they choose to pursue, would take this course as a "first course". The course "Computer Hardware and Software Maintenance" is recommended for the 10th grade level for career pathways in Information Support & Services and Networking. Also, the course "Computational Thinking" is recommended for the 10th grade level for Computer Programming, Digital Design/Gaming and Computer Science.

Students following career pathway course sequences have the opportunity to earn industry recognized certifications e.g. Network +, A +, I-Net +, Server + as they study for their pathway areas. Also many of these certifications may provide articulation opportunities for students who enter Kentucky Community and Technical Colleges, following high school graduation.

The Program of Study for each career pathway in Information Technology is outlined in the attached "Career Pathway – Course Sequence" charts. Also, specific information on curriculum and course description with content/process information is included in this document. A career pathway description with content/process information is attached for each of the eight "career pathways" in Information Technology.

(Course descriptions/curriculum for courses such as A+, Nortel, CISCO, Novell, Microsoft, etc. should be secured from the company/vendor.)

Career Pathways:
- Computer Programming
- Computer Science
- Web Development/Administration
- Geographic Information Systems
- Information Support and Services
- Network Administration
    - Microsoft (MCSA or MTA networking)
    - Cisco (CCNA or CCENT)
    - Security
    - CompTIA
    - Non-Vendor
- Informatics
- Digital Design/Gaming
- COMING FOR 2015-2016 – POSSIBLE BIT PATHWAY – COMBINATION OF BUSINESS AND INFORMATION TECHNOLOGY
- COMING FOR 2015-2016 – POSSIBLE CIT PATHWAY – COMBINATION OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

Standard Based Curriculum
The curriculum is composed of standards based competencies. Therefore, the teaching/learning focus is on the final results rather than the process. Information Technology Teachers are lecturing less and facilitating more, and as a result, students are taking charge of their own learning by using technology to research topics, collect data and present information orally and in written form. More Information Technology Programs are incorporating school-based enterprises in order for students to apply information technology concepts learned in the classroom.

Kentucky Occupational Skill Standards
The Kentucky Occupational Skill Standards are the performance specifications that identify the knowledge, skills, and abilities an individual needs to succeed in the workplace. Identifying the necessary skills is critical to preparing students for entry into employment or postsecondary education. Because of the importance of skill standards, the Office of Career and Technical Education in conjunction with industry to develop a system to certify that students have attained the necessary skills for employment or postsecondary education. Standards are being piloted in the areas of Web Development/Administration, Programming, Information Support & Services and Network Administration. These standards describe the necessary **occupational, academic,** and **employability** skills needed to enter the workforce or post- secondary education in specific career areas. There is an ongoing effort to continue to refine these standards by which exemplary Information Technology Programs are evaluated and certified. The strength of these business partnerships insures that curriculum meets industry specifications.

Interdisciplinary Courses
The Kentucky graduation requirements allow for interdisciplinary or applied courses to substitute for specific academic courses required for graduation.

School Based Enterprises
In many Kentucky high school Information Technology programs a school based enterprise is an integral part of the curriculum. Running an actual business allows students to learn contextually without leaving school. Textbook concepts become real as students operate a business.

Work Based Learning
Cooperative experience, internships, shadowing and mentoring opportunities provide depth and breadth of learning in the instructional program and allow students to apply the concepts learned in the classroom.

Students are encouraged to participate in cooperative education and other work-based learning experiences. Cooperative Education consists of in-school instruction combined with on-the-job work experience. Specific guidelines are outlined in 705 KAR 4:041. Information on other types of work-based learning are described in detail in the document Work-Based Learning Guide 2000 available on the KDE web page at http://education.ky.gov/CTE/cter/Pages/WBL.aspx. ***Be sure to use the new course codes for Information Technology Co-op and Internship.

Student Organization
Each school offering a program in Information Technology is encouraged to offer an appropriate student organization, either FBLA or SkillsUSA. Participation in FBLA or SkillUSA organization meets the requirements of Kentucky CTE Program Assessment Standard 9. The student organization skills should be an integral part of the curriculum and included in daily lesson plans. They are also encouraged to have students participate in the Student Technology Leadership Program (STLP). Participation provides a vehicle for students to employ higher order thinking skills, to interact with high-level industry people and to further enhance their leadership skills through their participation in regional, state and national competitive events and local activities.

KDE Career Pathways
Information Technology
2014-2015

Career Pathway	Sequence of Core Courses	Elective Courses

Computer Programming CIP 11.0201.01
 	
NAF Computer Programming CIP 11.0201.88
Tests for Certification:
 	
• CompTIA Strata IT Fundamentals
 	
• CompTIA
 	
  • A + (701 and 702)
 	
  • Network +
 	
  • Security +
 	
  • Server +
 	
  • Linux +
 	
• Microsoft Technology Associate
 	
• Sun Certified Java Associate
 	
• Sun Certified Java Professional
 	
• Adobe Certified Expert
 	
• Adobe Certified Associate
 	
  • Dreamweaver
 	
  • Flash
 	
  • Photoshop
 	
  • KOSSA Communications (2013 -2014)
  KOSSA Programming (2014-2015)
	1. 110110 Computer Literacy (CIT 105)
	
	2. 110251 Computational Thinking (CIT 120)
	
	3. 110201 Programming Introduction: e.g. JAVA, JavaScript, C++, Visual Basic – KCTCS is recommending concentration on JavaScript
	
	4. **Course code for a Specific Programming Language should be utilized (e.g. JAVA, C++, Visual Basic) – preferably C++
		1) Web Page Development
		
		2) Internet Technologies
		
		3) Computer Hardware and Software Maintenance
		
		4) Introduction to Database Design (Database Design Fundamentals)
		
		5) AP Computer Science
		
		6) Productivity Software
		
		7) Internet Technologies
		
		8) Special Topics, Programming
		
		9) Other Courses Approved by Information Technology Consultant Related to Career Major

Web Development & Administration CIP 11.0801.01
 	
NAF Web Development & Administration CIP 11.0801.88
 	
Tests for Certification:
 	
• CompTIA
 	
  • A + (701 and 702)
 	
  • Network +
 	
  • Security +
 	
  • Server +
 	
  • Linux +
 	
• CompTIA Strata IT Fundamentals
 	
• Adobe Certified Associate
 	
  • Dreamweaver
 	
  • Flash
 	
  • Photoshop
 	
• Adobe Certified Expert
 	
• CIW Foundations
 	
• CIW Web Associate
 	
• CIW Internet Business Foundations
 	
• CIW Site Development Foundations
 	
• CIW Network Technology Foundations
 	
• Internet and Computing Core Certification (IC3-3 Exams
	1) 110110 Computer Literacy (CIT 105)
	
	2) 110801 Web Page Development (CIT 155)
	
	3) 110804 Web Site Design and Production (CIT 157)
	
	4) 110917 Internet Technologies (CIT 150)
		1) Computer Hardware and Software Maintenance
		
		2) Computational Thinking
		
		3) Programming Introduction
		
		4) Introduction to Database Design (Fundamentals)
		
		5) Special Topics, Web Development/Administration
		
		6) Other Courses Approved by Information Technology Consultant Related to Career Major

Required)

- Computer Fundamentals

- Key Applications

- Living Online

- Microsoft Technology Associate

- WOW Certified Associate Webmaster (CAW)

- Certified Web Administrator Apprentice (CWAA)

Certified Web Designer Apprentice (CWDSA)

KOSSA Communications-2013-2014

KOSSA Web Design – 2014-2015

Geographic Information Systems CIP 45.0702.00	1) 110110 Computer Literacy (CIT 105)	1) Computer Hardware and Software Maintenance
Tests for Certification:	2) 110107 Introduction to GIS – ArcView (CIT 125)	2) Computational Thinking
- CompTIA Strata IT Fundamentals	3) 110315 GIS Software Tools & Applications (CIT225)	3) Internet Technologies
- CompTIA	4) 110316 Special Topics in GIS (CIT229)	4) Other Courses Approved by Information Technology Consultant Related to Career Major
- A + (701 and 702)		
- Linux +		
- Network +		
- Security +		
Server +		
KOSSA Communications		

Information Support and Services CIP 47.0104.01	1) 110110 Computer Literacy (CIT 105)	1) Security Fundamentals

Information Support and Services
CIP 47.0104.01

NAF Information Support and Services CIP 47.0104.88

Tests for Certification:

☐ CompTIA
☐ A + (701 and 702)
☐ Linux +
☐ Network +
☐ Security +
☐ Server +
☐ CompTIA Strata IT Fundamentals
☐ Help Desk Institute (HDI)
☐ Customer Service Representative
☐ Support Center Analyst
☐ Desktop Support Technician
☐ Support Center Team Lead
☐ Support Center Manager
☐ Support Center Director
☐ Knowledge Center Support
   Principles
☐ Internet and Computing Core
   Certification (IC3-3 Exams
   Required)
      Computer Fundamentals
      Key Applications
      Living Online
KOSSA Communications
(2013-2014)

KOSSA Computer Technician
(2014-2015)

1) 110110 Computer Literacy (CIT 105)

2) 110101 Computer Hardware and Software Maintenance (CIT 111)

3) 110102 Help Desk Operations (CIT 232)

4) 110152 Special Topics in Information Support and Services (CIT 299)

1) Security Fundamentals

2) Introduction to Networking Concepts

3) Internet Technologies

4) Introduction to Database Design (Fundamentals)

5) Help Desk II

6) Other Courses Approved by Information Technology Consultant Related to Career Major

Network Administration	ALL Network Admin.	1) Internet

Network Administration
    MCSA 11.1001.00
    Cisco 11.1002.00
    Security 11.1003.00
    CompTIA 11.0901.02
    Non-Vendor 11.0901.01

Tests for Certification:

- CompTIA Strata IT Fundamentals

- CompTIA

  - A + (701 and 702)

  - Network +

  - Security +

  - Server +

  - Linux +

- Novell Certified Linux Professional

- Novell Certified Administrator

- Microsoft Technology Associate (MTA)

- Microsoft Certified Technology Specialist (MCTS)

- Cisco Certified Entry Network *Technician* (CCENT)

Cisco Certified Network Associate (CCNA)

    KOSSA Communications (2013-2014)
    KOSSA Networking (2014-2015)

Network Administration (cont.)

ALL Network Admin. TRACKS:

1) 110110 Computer Literacy (CIT 105)

2) Computer Hardware and Software Maintenance (CIT 111)

Non-Vendor Track CIP 11.0901.01

3) 110901 Introduction to Networking Concepts (CIT 160)

4) 110912 Security Fundamentals (CIT 180)

CompTIA Track Add: CIP 11.0901.02

3) 110901 Introduction to Networking Concepts (CIT 160)

4) 110952, Special Topics, Networking (CIT 299)

Cisco Track Add: CIP 11.1002.00

1) 110902 Network Fundamentals Cisco I (CIT 161)

2) 110903 Routing Protocol and Concepts Cisco II (CIT 210)

3) 110904 LAN Switching and Wireless/Scaling Networks/Cisco III

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1) Internet Technologies

2) Computational Thinking

3) Introduction to Database Design (Fundamentals)

4) Special Topics, Networking

5) Other Courses Approved by Information Technology Consultant Related to Career Major

	(CIT 211) 4) 110905 Accessing the WAN/Connecting Networks/Cisco IV (CIT 212) **(MCSA)Microsoft Track ADD CIP 11.1001.00** 1. 110901 Introduction to Networking Concepts (CIT 160) 2. 110913 MS Client/Server Config (CIT213) **Security Track ADD: CIP 11.1003.00** 3. 110901 Introduction to Networking Concepts (CIT 160) 4.110912Security Fundamentals (CIT 180)	

Informatics **CIP 11.0802.00** *Tests for Certification:* *KOSSA Communications*	1) 111001 Computers, Networks and Databases (INF 120) 2) 111002 Design for the Digital World (INF 128) 3) 111003 Databases in the Cloud (CIT 170) 4) 111004 Developing a Cloud Presence	1) Computer Literacy 2) AP Computer Science 3) AP Psychology 4) Computer Hardware and Software Maintenance 5) Computational Thinking 6) Internet Technologies 7) Other Courses Approved by Information Technology Consultant Related to Career Major

NEW – 2013-2014 Digital Design/Gaming CIP 36.0113.00	1) 110110 Computer Literacy (CIT 105)	1) Programming Introduction
	2) 110251 Computational Thinking (CIT 120)	2) 3D Digital Game Character Development
Tests for Certification:	3) 113602 Digital Applications, Texturing & Special Effects (Photoshop) – (DGD 131)	3) Digital 3D Graphics II: Texturing & Special Effects II
KOSSA Communications		4) Web Page Development
	4) 113601 Introduction to Digital 3D Game Graphics (DGD 132)	5) Introduction to Database Design (Fundamentals)
		6) Computer Hardware and Software Maintenance
		7) Other Courses Approved by Information Technology Consultant Related to Career Major

Computer Science CIP 11.0701.01	1) 110110 Computer Literacy (CIT 105)	1. Programming Introduction
TEALS Computer Science CIP 11.0701.02	2) 110251 Computational Thinking (CIT 120)	2. Web Page Development
PLTW Computer Science CIP 11.0701.03	3) 110701 AP Computer Science A	3. Introduction to Database Design (Fundamentals)
Advance Kentucky Computer Science CIP 11.0701.04	4) 110752 Special Topics in Computer Science (CIT 299)	4. Computer Hardware and Software Maintenance
Tests for Certification:		5. Internet Technologies
KOSSA Communications		6. Other Courses Approved by Information Technology Consultant Related to Career Major

SAMPLE IT CAREER PATHWAY

KENTUCKY CAREER PATHWAY/PROGRAM OF STUDY TEMPLATE

Recommended Course Sequence

COLLEGE/UNIVERSITY: KCTCS
HIGH SCHOOL(S): All Participating

CLUSTER: IT
PATHWAY: Network Administration
PROGRAM: Network Administration - CISCO (Courses below may change)

GRADE	ENGLISH	MATH	SCIENCE	SOCIAL STUDIES	REQUIRED COURSES / RECOMMENDED ELECTIVE COURSES / OTHER ELECTIVE COURSES / CAREER AND TECHNICAL EDUCATION COURSES			CREDENTIAL CERTIFICATE DIPLOMA DEGREE	SUGGESTED OCCUPATIONS
SECONDARY									
9	English I	Algebra I	Science	Social Studies	Computer Literacy - IT	Fundamentals of IC3		STRATA Fundamentals	
10	English II	Geometry	Science	History of Art	CompTIA A+	Computer Essentials	Cisco I	Comptia A+	
11	English III	Algebra II	Health & PE	Social Studies	Cisco I	Cisco II	Cisco I	CCENT	
12	English IV	Math Elective	Science	Social Studies	Cisco II	Cisco III	Cisco IV	CCENT KOSSA Networking Comptia Net+	
POSTSECONDARY									
Year 1 1st Semester	Gen Ed - ENG 101 Writing I (3)	Gen Ed/Prereq - MT 150 College Algebra (3)			CIS 120 Program Design (3)	CIS 107 Database Apps (1hr)	IT 130/132 Web Page Dev (4/3)	CIW Foundations	
Year 1 2nd Semester	Gen Ed - ENG 102 Writing II (3)	Gen Ed - Science with a lab (4)			IT 170 Intro Database (3)	Beginning Programming (3)	CIS 130 Micro Apps (3)		
Summer Semester									
Year 2 1st Semester	Gen Ed - Oral Communications (3)	Gen Ed - Social Interactions (3)			IT 220 Cisco III (4)	IT 222 Cisco IV (4)	Technical elective (3)	CCNA	
Year 2 2nd Semester	Gen Ed - Heritage / Humanities (3)				MIS 213 Win Server Topic (3)	Technical elective (3)	Technical elective (3)	Associate of Applied Sciences (AAS) KCTCS A+ Certification IT Fundamentals Certification KCTCS CISCO Network Enhanced	
Summer Semester									

Credential note (bottom): IT Fundamentals Certification

	Hours
Total Gen Ed Hours:	22
Total Technical Core Hours:	24-27
Total Option Hours:	21
Total Degree Hours:	67-70

Legend:
- Courses needed for graduation requirements
- Recommended CTE Courses
- Elective Courses
- Credit-Based Transition Programs (e.g. Dual/Concurrent Enrollment, Articulated Courses, 2+2+2) (◆ -High School to Comm. College) (●-Comm. College to 4-Yr Institution) (■-Opportunity to test out)

Computer Literacy
Valid Course Code
110110

Course Description:
Introduces students to the main components of computer literacy including Computer Fundamentals, Key Applications and Living Online. Provides an introduction to the computer and the convergence of technology as used in today's global environment. Introduces topics including computer hardware and software, file management, the Internet, e-mail, the social web, green computing, security and computer ethics. Presents basic use of application, programming, systems and utility software. Basic keyboarding skills are strongly recommended.

Content/Process

Students will:

1. Considering the Computer:
   a. Identify what a computer does
   b. Provide a brief history of the computer
   c. Explain the different types of personal and multiuser computers
   d. Identify other computer devices such as handheld, mobile, and video game systems
   e. Identify proper ergonomics to improve comfort and safety of the end user
2. Hardware:
   a. Identify the CPU, the parts of the system unit and the motherboard
   b. Briefly describe binary code
   c. Identify different storage devices
   d. Highlight different input and output devices and their uses
   e. Explain the different types of printers
   f. Describe communication devices and their purpose
   g. Explain the impact of computers upon society including effects of social technologies, green computing, dangers of excessive use, and disposal of obsolete equipment
   h. Maintain computer equipment and solve common problems relating to computer hardware
3. File Management:
   a. Use a graphical user interface-based operating system to manage files, folders and disks
   b. Create folders to organize files
   c. Explain file extensions and file properties
   d. Review the importance of backing up files and how to do it within the operating system
   e. Demonstrate how to compress files
   f. Use search possibilities to locate files
   g. Re-associate files to a different program
4. Application and System Software
   a. Use a course management system
   b. Utilize computer technology as a tool to access, manage, prepare and present information
   c. Identify trends in information processing and new emerging technologies
   d. Identify and analyze ethical issues such as copyright, privacy and security as related

to computing
- e. Explain the difference between application, programming, system and utility software
- f. Use application software packages to prepare basic documents, spreadsheets, databases and presentations.
- g. Identify different types of business and personal software
- h. Explain system requirements for installing and using software
- i. Explain licensing, freeware, shareware, open source and retail software
- j. Explain the difference between application and Operating system software
- k. Review different types of system software
- l. Manipulate text and format a document using word processing software
- m. Create worksheets, use basic formulas and create graphs using spreadsheet software.

5. Networking
- a. Describe and explain basic data communications and network technologies and functions
- b. Review the history of the Internet
- c. Explain how networks operate and how to connect to them
- d. Compare different web browsers
- e. Identify different ways to navigate and search the web
- f. Review social networking and its impact on today's society
- g. Review forums, discussion boards, blogs, podcasts, etc.
- h. Review e-commerce and social media marketing
- i. Identify and use basic e-mail and Internet functions and understand their capabilities
- j. Describe globalization and challenges including technological barriers, electronic payments and varying cultures
- k. Describe cloud computing and its impact on business and personal systems

6. Online/Internet
- a. Apply Internet etiquette and safety
- b. Explain the differences between a web browser and a search engine
- c. Navigate a World Wide Web browser
- d. Identify Internet search engines and their advantages and disadvantages
- e. Demonstrate proficiency in the use of the Internet
- f. Discriminate between ethical and unethical use of computers and information
- g. Demonstrate an understanding of copyrights and licensing
- h. Demonstrate an awareness of computer security and a basic understanding of ways to protect a computer (e.g. viruses, Trojans, and Malware)

Connections: Post-Secondary: KCTCS CIT 105 Introduction to Computers
CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
Kentucky Occupational Skill Standards
Secretary's Commission on Achieving Necessary Skills (SCANS)
Common Core State Standards ELA, Math & Science
21st Century Skills
Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Course Description: Focuses on the design of computing systems, including instruction in the principles of computer hardware and software components, algorithms data basis, telecommunications, etc. Includes the knowledge to identify and explain PC components, setup a basic PC workstation, conduct basic software installation, identify compatibility issues and recognize/prevent basic security risks and also gives knowledge in the areas of Green IT and preventative maintenance of computers.

Content/Process

Students will:

1. Hardware Basics
   a. Identify basic IT Vocabulary (e.g., RAM, processor speed/cores, hard drives, networking)
   b. Demonstrate the proper use of hardware devices
   c. Explain the characteristics and functions of internal and external storage devices
   d. Explain the characteristics, installation, configuration, troubleshooting, upgrading and functions of peripheral devices
   e. Explain the characteristics and functions of core input devices
   f. Demonstrate the ability to set up a basic PC workstation
   g. Identify the steps to install, configure, optimize, and upgrade personal computer components and peripherals
2. Compatibility Issues and Common Errors
   a. Identify basic compatibility issues
   b. Recognize common operational problems caused by hardware or software
   c. Demonstrate the ability to minimize risks
   d. Isolate and identify computer problems using visual/audible inspection of components and follow appropriate troubleshooting procedures (e.g., status lights, beep codes, visual inspection of circuitry)
   e. Access needed information using company and manufacturer' references to fix common errors
   f. Define fault tolerance, disaster recovery, and various backup types/backup media (e.g. RAID levels)
3. Software (Application and Operating System) Installation and Functions
   a. Identify the steps to install, configure, optimize, remove, upgrade, and recover software.
   b. Identify issues related to folder and file management
   c. Explain the function and purpose of software tools including imaging software
   d. Identify software tools, diagnostic procedures, and troubleshooting techniques for computer components and operating Systems
   e. Identify the steps to use Control panel applets and Task Manager for system management
   f. Identify the steps to configure and troubleshoot remote access and connections
   g. Convert among decimal, binary and hexadecimal number systems

4. Application Support
   a. Explain troubleshooting guidelines and tools to support users configuring, customizing

and running applications including email servers.
- b. Identify hardware requirement as they relate to compatibility and troubleshooting of software applications
- c. Explain how to backup client files
- d. Identify the steps to configure and troubleshooting application access on a network

5. Compare and contrast client operating systems and their features.
- a. Windows version history, types, files and features
- b. Identify locations, purposes, and characteristics of operating system files

6. Security
- a. Recognize basic security risks
- b. Identify prevention methods
- c. Identify access control methods
- d. Identify security threats
- e. Recognize security breaches and ways to resolve them.

7. Green IT and Preventive Maintenance
- a. Identify environmentally sound techniques to preserve power and dispose of materials.
- b. Identify green techniques, equipment and procedures
- c. Identify preventative maintenance products, techniques, and how to use them.

8. Describe and apply appropriate operational procedures including safety, environmental procedures, good communication skills, and professional behavior.
- a. Safety
- b. Environmental procedures
- c. Communication skills
- d. Professionalism in the workplace

9. Portable Computing Devices
- a. Identify the steps to install, configure, upgrade, and support laptops/portable devices and identify the names, purposes, and characteristics of mobile computer systems.
- b. Explain appropriate use for mobile specific communications
- c. Identify major components of portable devices (e.g. parts of LCD)
- d. Use Troubleshooting Techniques to diagnose and repair Portable Devices

10. Networking
- a. Describe, identify and implement basic physical networking components and concepts (e.g. cables, connectors, connections types, network devices, server, switch, router, access point, port identification, and usage)
- b. Install, configure, and troubleshoot network interfaces and manage wired/wireless connections including IP configuration
- c. Utilize command line functions and utilities to diagnose and troubleshoot network connection issues.
- d. Share resources such as files and printers among multiple computers
- e. Recognize threats to a home network and identify ways to implement security protocols

Connections

Post-Secondary: KCTCS CIT 111 Computer Hardware and Software
CTSO's – SkillsUSA, FBLA; (STLP encouraged even though not a recognized student organization for program review)
Kentucky Occupational Skill Standards
Secretary's Commission on Achieving Necessary Skills (SCANS)
Common Core State Standards ELA, Math & Science
21st Century Skills
Nationally Recognized Industry Standards and Certifications – refer back to pathway document

<div align="center">

Computational Thinking
Valid Course Code
110251

</div>

Course Description:
Students analyze the structure of the worldwide web, apply basic principles of web documents and HTML, and develop multi-media web pages. Course content will include the understanding of hypertext and web structures. Equipment such as scanners, digital and video cameras and sound recording devices will be utilized through hands-on instruction. Promotes understanding of computer programming and logic by teaching students to "think like a computer". Covers skills needed to develop and design language-independent solutions to solve computer related problems. Covers developmental and design basics including use of variables, control and data structures, and principles of command-line and object-oriented languages.

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Content/Process

</div>

Students will:

1. Demonstrate an understanding of elementary logic, truth tables, and Boolean Algebra VI. Making Decisions: Boolean Algebra - AND, OR, and NOT; Decision statements: single, multiple, and nested

2. Demonstrate programming style best practices.

3. Effectively present a precise and accurate written communication using proper grammar, spelling, punctuation, etc., Demonstrate the ability to work as a team member as well as using conflict resolution techniques,

4. Demonstrate correct use of computer terminology and ethical usage of software and hardware, Demonstrate ethical behavior in the workplace: e.g. non-harassment, honesty, non-discrimination, professionalism, etc., Prepare resume, letter of application and participate in an interview, Implement new process steps given oral instructions.

5. Illustrate the flow of a program: III. Program Design Tools; Flowcharting, Pseudo-code IV. Control Structures; Sequence, Repetition, Selection: V. Modularity; Modules, Arguments, parameters, pass-by-value and pass-by-reference

6. Illustrate concepts using one or more programming language(s).

7. Explain the implications of file processing: II. Data Types and Variables, Data types - integers, reals, characters, strings, Booleans, Variables, literals, and constants, Variable scope

8. Describe the steps addressed in the design of a program to solve the stated problem: III. Program Design Tools; Flowcharting, Pseudo-code

9. Describe the principles of object-oriented programming; I. An Overview of Computers and Logic; Procedural vs. object-oriented programming, Compilers and interpreters, Binary and hexadecimal numbers, Documentation - internal and external

10. Develop algorithms with increasing degree of complexity using structured programming techniques such as: sequence, selection, and repetition; IX. Other, File usage, Searching algorithms, Sorting algorithms

11	Use fundamental data types and data structures such as : integers, reals, characters, strings, Booleans, one-and two-dimensional arrays; II. Data Types and Variables, Data types - integers, reals, characters, strings, Booleans, Variables, literals, and constants Variable scope. VIII. Array Processing; Single dimension arrays, Multi-dimensional arrays
12	Analyze the binary representation of data; I. An Overview of Computers and Logic, Procedural vs. object-oriented programming, Compilers and interpreters, Binary and hexadecimal numbers, Documentation - internal and external
13	Use modular programming; V. Modularity: Modules, Arguments, parameters, pass-by-value and pass-by-reference; VII. Looping: Pre and post test, Counter controlled, Nested
14	Identify potential safety hazards and take preventative action.
15	Use Material Safety Data Sheets (MSDS) or equivalent documentation and appropriate equipment documentation.
16	Identify potential hazards and implement proper safety procedures including ESD precautions and procedures, safe work environment and equipment handling.
17	Use good communication skills including listening and tact/discreation, when communicating with customers and colleagues.
18	Use job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customers' property.
19	Demonstrate proficiency in use of the Internet.
20	Demonstrate proficiency in a graphics software package.
21	Demonstrate proficiency in a word processing package.
22	Demonstrate proficiency in a spreadsheet package.
23	Describe common applications of a database.
	24. Apply work site and lab safety procedures, Apply personal safety rules and procedures, Apply fire prevention rules and procedures, Demonstrate accountability of and the safe and careful use of company equipment, machines etc.

a) An overview of computers and logic
  a. Procedural vs. object-oriented programming
  b. Compilers and interpreters
  c. Binary and hexadecimal numbers
  d. Documentation – internal and external
b) Data Types and Variables
  a. Data types – integers, reals, characters, strings, Booleans
  b. Variables, literals and constants
  c. Variable scope
c) Program Design Tools
  a. Flowcharting

    b. Pseudocode
  d) Control Structures
    a. Sequence
    b. Repetition
    c. Selection
  e) Modularity
    a. Modules
    b. Arguments, parameters, pass-by-value and pass-by-reference
  f) Making Decisions
    a. Boolean Algebra – AND, OR and NOT
    b. Decision statements: single, multiple and nested

  g) Looping
    a. Counter controlled
    b. Nested
  h) Array Processing
    a. Single dimension arrays
    b. Multi-dimensional arrays
  i) Files and Algorithms
    a. File usage
    b. Searching algorithms
    c. Sorting algorithms

Connections

Post-Secondary: KCTCS CIT 120 Computational Thinking
CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
Kentucky Occupational Skill Standards
Secretary's Commission on Achieving Necessary Skills (SCANS)
Common Core State Standards ELA, Math & Science
21st Century Skills
Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Programming Introduction (e.g., JAVA, C++, C#, Visual Basic)
Valid Course Code
110201

Course Description: Focuses on the general writing and implementation of generic and atomized programs to drive operating systems. Includes software design, languages, and program writing, trouble-shooting, etc. Introduces students to fundamental programming concepts using an industry-specific or emerging programming language. Includes data types, control structures, simple data structures, error-handling, modular programming, information and file processing, and uniqueness of the language used in the course.

Content/Process

Students will:

1. Demonstrate knowledge of the program development life cycle.
   a. Program Development Life Cycle
   b. Steps in life cycle
   c. Using the life cycle
2. Design, develop, compile, debug, test, run, and document programs in the language studied.
   a. Software Development
   b. Write code
   c. Compile code
   d. Debug code
   e. Test code
   f. Execute code
   g. Document
3. Design and develop programs using operators and assignments.
   a. Operators and Assignments
   b. Assignment operators
   c. Arithmetic operators
   d. Relational operators
   e. Logical operators
   f. Compound operators
   g. Data type casting
4. Design and develop programs that properly use variable, constants, data types, and objects.
   a. Memory and Processor Usage
   b. Variables
   c. Constants
   d. Primitive data types
   e. Objects
5. Design and develop programs that use sequence, selection, and repetition structures.
   a. Control Structures
   b. Sequence
   c. Selection
   d. Repetition
6. Design and develop programs that use simple data structures.
   a. Data structures
   b. Single-dimension arrays
   c. Multi-dimension arrays
   d. Other data structures unique to the language
7. Design and develop programs that use effective error and exception handling.

      a. Errors
      b. Type of errors
      c. Error handling
      d. Exception handling

8. Design and develop programs that implement user-defined methods and modular programming.
      a. Structured Programming
      b. User-defined modules
      c. Built-in methods and modules

9. Design and develop programs that implement file processing.
      a. File Processing
      b. Standard input and output devices
      c. Reading from files
      d. Writing to files

10. Design and develop programs that implement fundamental features that are unique to the language studied.
      a. Unique Concepts of Language
      b. Methods
      c. Features

11. Design and develop programs using object oriented programming features, if applicable to the language studied.
      a. Object-Oriented Programming (if applicable to the language)
      b. Classes
      c. Objects
      d. Instantiation

12. Evaluate and critique effectiveness and efficiency of code written.
      a. Evaluation of Programming
      b. Effectiveness of code
      c. Efficiency of code

Connections

Post-Secondary:
CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
Kentucky Occupational Skill Standards
Secretary's Commission on Achieving Necessary Skills (SCANS)
Common Core State Standards ELA, Math & Science
21st Century Skills
Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Web Page Development
Valid Course Code
110801

Course Description: Web Page Design using HTML will be introduced. Creating web documents using a simple text editor will be the main focus. How to use a simple web editor will also be covered. Features such as layout, tables, images, forms, frames and the incorporation of sound and video will be explored. Developing site specifications and methods to increase the appeal and effectiveness of web sites are included. How to prepare web documents appropriate for use in business and professional web sites will be covered. Also, this course introduces CSS and emphasizes W3C web design and accessibility standards.

Content/Process

Students Will:

1. Plan the layout of a website.
    a. How to storyboard a web page/site
    b. The use of templates in page/site design
    c. Accessibility standards
    d. Browser compatibility
    e. File management
2. Use HTML (Hypertext Markup Language)
    a. Overview of HTML and Vocabulary
    b. Compare HTML & XHTML
    c. Explore the use of text editors and web creation software
    d. Nested elements
    e. Attributes
    f. Headings
    g. Paragraphs
    h. Formatting
    i. Styles
    j. Lists
3. Use CSS (Cascading Style Sheets)
    a. Use inline, embedded and external CSS
    b. Using CSS selectors and declarations
    c. Selecting and formatting fonts with CSS
    d. Text properties with CSS
    e. Working with headings
    f. The difference between block and inline level elements
    g. Color selection and the web color palette
    h. CSS Class, ID and contextual selectors
    i. Styling HTML structural elements – header, section, nav, footer
    j. Using the box model
    k. Margins and padding with CSS
    l. Borders with CSS
4. Website Layout
    a. How to create a text link
    b. How to create an email link
    c. The target and name attributes
    d. Style link with CSS
    e. Opening links in new windows/tabs
    f. Use IDs and anchors to link to sections on a web page and to multiple web pages

5. Use multimedia in the creation of a website (i.e. images, sound and video
   a. Image types (JPG, BMP, TFF, PNG, RAW, PSD)
   b. How to obtain images legally
   c. Inserting an image
   d. Image alignment
   e. Using an image as a background
   f. Using images as links
   g. Image maps
   h. Image captions
   i. Optimizing a photo for the web
6. Use HTML and CSS in page layout
   a. Creating lists – ordered, unordered and definition lists
   b. Using tables for page layout
   c. Using relative and absolute position
   d. Defining page size
   e. Using the div element
   f. Using the float element
   g. Using overflow
   h. Using CSS two-column page layout
   i. CSS interactivity with pseudo-classes
   j. CSS for print
7. Create lists and tables in organizing content
   a. Table elements – rows, cells and headers
   b. Spanning rows and columns
   c. Style a table with CSS
8. Create web forms
   a. Form elements
   b. Submit and reset buttons
   c. Checkbox and radio buttons
   d. Hidden fields and password boxes
   e. Textarea element
   f. Format a form using tables
   g. Select an option element
   h. Label element
   i. Field set and legend elements
   j. Style a form with CSS
   k. HTML form controls – datalist, search box, calendar control, color picker control
9. Use multimedia in the creation of a website (i.e. images, sound, video)
   a. Configure sound and video
   b. Audio, video and flash with the object element
   c. HTML audio, video, and embed elements
   d. Web publishing basics
   e. Registering a domain name
   f. Choosing a web host
   g. Publish with File Transfer Protocol (FTP) and other file transfer tools
   h. Search engine submission and optimization
   i. Accessibility and usability testing

Connections

Post-Secondary: KCTCS CIT 155: Web Page Development
CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
Kentucky Occupational Skill Standards
Secretary's Commission on Achieving Necessary Skills (SCANS)
Common Core State Standards ELA, Math & Science
21st Century Skills
Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Course Description:
This course gives the student an experience with advanced topics in planning and implementing a professional web site. Emerging technologies will be explored in creating interactive web pages that incorporate cascading style sheets, DHTML, JavaScript and multimedia and graphics. Designing for a cross-browser web site and different monitor resolutions should be covered. Introduces web site production processes with emphasis on design involving layout, navigation, interactivity and using web production software.

Content/Process

Students Will:

1. Utilize principles of graphic and content creation for online media

   I. Production Tools
   A. HMTL approaches
   B. HTML and interactive editors
   C. Graphics applications
   D. Multimedia applications
   II. Pre-Production Process
   A. Project definition and planning
   B. Functional requirements
   C. Content and media assets organization
   D. Basic project management concepts
   E. Production phases.

2. Use fundamental online graphic design principles including appropriate interactivity, content sensitive navigation schemes and user interface criteria.

   III. Layout and Design
   A. The web as a medium
   B. Web design principles
   C. Web design issues
   D. Separation of content and format
   E. Other design issues
   IV. User Interface Design
   A. User interface definition
   B. Interface design basics
   C. Interface usability
   D. Navigation design basics
   E. Navigation usability

3. Select task-appropriate software tools

4. Utilize web site accessibility.

   V. Accessibility and internationalization
   A. Accessibility
   B. Localization and translation
   VI. Media Creation
   A. Image creation

B. Image manipulation
                    C. Digital video
            VII.   Interactivity
                A. Appropriate interactivity
                B. Interactive elements
                C. User-by-user interactivity
            VIII. Testing and Optimization
                    A. Site clean-up and testing
                    B. Error checking
                    C. Speed optimization
                    D. Web site management
                    E. Web site maintenance
                    F. Usability testing
    5. Utilize web site implementation and hosting.

            IX. Implementation and Hosting
                    A. Client sign-off
                    B. Legal review
                    C. File publishing to the web
    6. Edit and enhance digital video images using appropriate software.

Connections

Post-Secondary: KCTCS CIT 157: Web Site Design & Production
CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
Kentucky Occupational Skill Standards
Secretary's Commission on Achieving Necessary Skills (SCANS)
Common Core State Standards ELA, Math & Science
21st Century Skills
Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Introduction to Networking Concepts
Valid Course Code
110901

Course Description: Introduces technical level concepts of non-vendor specific networking including technologies, media, topologies, devices, management tools, and security. Provides the basics of how to manage, maintain, troubleshoot, install, operate, and configure basic network

Content/Process

Students will:
1. Networking Fundamentals
   a. Understand types of networks and utilize basic networking terms.
   b. Understand Network Concepts in Historical Context.
   c. Demonstrate how to configure and connect network devices. (e.g. computers, printers, routers, switches, connectors)
   d. Understand the advantages to sharing resources through network devices.
   e. Differentiate between the different types of networking topologies. (e.g. Bus, Ring, Star, Extended-Star, Mesh, Tree)
   f. Demonstrate how to troubleshoot and diagnose a network problem using a systematic approach identifying the appropriate tools, selecting an appropriate course of action to resolve the problem, and document the solution. (e.g. Ping, tracenet, IP config, wiring diagrams)
   g. Identify and explain common methods to ensure network security including antivirus software, user authentication, and firewall setup.
   h. Identify issues that affect physical and remote access device security.
   i. Define and demonstrate/purpose of fault tolerance, disaster recovery, various back-up types, firewalls, proxy servers, V-LANs, extranets and intranets and various network server operating systems.
2. Routing Protocols and Concepts
   a. Describe and apply the concepts associated with the OSI/TCP-IP Models.
   b. Identify addressing format, schemes, and technologies; and required settings for connectivity including classful/classless address ranges, public/private addressing, and subnetting.
   c. Describe the purpose and function/functionality of a router and the path taken by packets throughout a network.
   d. Demonstrate how to configure/troubleshoot and explain different routing protocols. (e.g. static, default routing, distance-vector)
3. Small to Medium Business or ISP Networking
   a. Demonstrate how communication occurs between hosts.
   b. Describe the different WAN connectivity to telecommunication services. (e.g. ISDN, POP, T1)
   c. Demonstrate the ability to monitor network performance, isolate and repair failures and troubleshoot problems utilizing an organized layered procedure.
4. LAN Switching and Wireless
   a. Explain the technology and media access control method for Ethernet networks.
   b. Describe the standards associated with wireless A, B, G, N standards, IEEE alliance.
   c. Demonstrate wireless security protocols and be able to describe wireless services

Connections

Post-Secondary: KCTCS CIT-160 Introduction to Networking
CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
Kentucky Occupational Skill Standards
Secretary's Commission on Achieving Necessary Skills (SCANS)
Common Core State Standards ELA and Math
21st Century Skills
Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Network Fundamentals: Introduction to Networks (Cisco I)
Valid Course Code
110902

Course Description: Introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. Provides the opportunity to build simple LAN topologies by applying principles of cabling; performing basic configurations of network devices, including routers and switches; and implementing IP addressing schemes. Completes one of a series of four courses that helps prepare students for the Cisco Certified Network Associate (CCNA) certification exam and the Cisco Certified Entry Networking Technician (CCENT). (This is the first course in the Cisco Curriculum.)

Content/Process

Students will:

1) Explain how communication works and the importance of data networks and the Internet in supporting business communications and everyday activities:
   a. Importance of Networks.
   b. Network impacts on daily lives
   c. Role of data networking in the human network
   d. Key network component identification
   e. Opportunities and challenges of converged networks
   f. Characteristics of network architectures
   g. Installing network application

2) Recognize the devices and services that are used to support communications across an Internetwork:
   a. Network Components
   b. Network devices
   c. Network connections
   d. Network communication
   e. Network rules and processes
   f. Network tools and commands

3) Describe the importance of addressing and naming schemes at various layers of data networks.

4) Examine network protocol models to explain the layers of communications in data networks.

5) Identify protocols and services provided by the layers in the OSI and TCP/IP models:
   a. OSI and TCP/IP Models Overview
   b. Functions
   c. Services
   d. Communication across layers
   e. Peer-to-peer
   f. Compatibility
   g. Network analysis tools
   h. Transport Layer:

      i. Role and functions
     ii. Layer Protocols: TCP and UDP
    iii. Layer Protocol use and key functions
  i. Network Layer:
      i. Role and functions
     ii. Layer Protocol: IP
        1. Layer Protocol use and key functions
        2. Communication devices
        3. Dynamic and Static routes, next-hop addresses, and packet forwarding
  j. IP Addressing
      i. IP Version 4 addressing structure, classes, reserved networks
     ii. IP Version 6 addressing structure and format
    iii. Binary, decimal, and hexadecimal number systems and number conversions between the three
    iv. Address assignment using IP version 4 and IP version 6
     v. Classfull IP Ranges
    vi. Classless IP Ranges
    vii. Host and network addressing
   viii. Common testing utilities
    ix. Explain the fundamental concepts of routing

6) Design, calculate, and apply subnet masks and addresses to fulfill given requirements.

7) Employ basic cabling and network designs to connect devices in accordance with stated objectives:
  a. Ethernet
      i. Evolution and history
     ii. Ethernet fields
    iii. Functions, characteristics, and media access
    iv. Ethernet and its relationship to the OSI and TCP/IP models
     v. Ethernet hubs and switches
    vi. Address Resolution Protocol (ARP)

8) Design a simple Ethernet network using routers, switches, hubs, and a variety of hosts.

9) Explain the role of physical layer protocols and services in supporting communications across data networks:
  a. Physical Layer
      i. Role and Functions
     ii. Layer signaling and coding
    iii. Layer Protocol use and key functions
    iv. Media characteristics and uses (OH 8, 9)
     v. Correct use of different types of network media

10) Describe the operation of protocols at the OSI data link layer and explain how they support communications:
  a. Data Link Layer
      i. Role and Functions
     ii. MAC address structure
    iii. Unicasts, multicasts, and broadcasts
    iv. Layer Protocol use and key functions
     v. Communication devices

  vi. common logical network topologies

  vii. Encapsulation process

  viii. Frame components

11) Use command-line interface commands to perform basic router and switch configuration and verification. Analyze the operations and features of common application layer protocols such as Hypertext Transfer Protocol (HTTP), Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), Simple Mail Transfer Protocol (SMTP), File Transfer Protocol (FTP), and Telnet.

12) Utilize common network utilities to verify small network operations and analyze data traffic.

13) Describe initial switch configuration tasks including remote access and management and switching technologies.

Connections

- Post-Secondary: KCTCS CIT-161 Networking Fundamentals
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills
- Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Routing Protocols and Concepts – Routing and Switching Essentials – Cisco II
Valid Course Code
110903

Course Description:
Provides students with the skills necessary to understand and apply concepts related to networking routing and switching hardware. Covers TCP/IP concepts such as IP addressing and subnetting, router configuration, routed and routing protocols. Completes one of a series of four courses that helps prepare students for the Cisco Certified Network Associate (CCNA) certification exam and the Cisco Certified Entry Networking Technician (CCENT). (This is the second course in the Cisco Curriculum.)

Content/Process
Students Will:

1. Describe the purpose and use of routers and routing tables.
2. Explain the critical role routers play in enabling communications across multiple networks
3. Describe how a router determines a path and switches packets in routed networks.
4. Explain the route lookup process and the path packets will take in a network.
5. Demonstrate ability to perform basic configurations for a newly-installed router.
6. Describe the purpose of static routes and dynamic routing protocols in the context of modern network design.
7. Configure and verify static and default routing.
8. Describe how metrics are used by routing protocols and identify the metric types used by dynamic routing protocols.
9. Identify and describe the characteristics of distance vector and link-state routing protocols.
10. Describe the network discovery process of distance vector routing protocols using Routing Information Protocol (RIP).
11. Describe the functions, characteristics, and operations of the RIPv1, RIPv2, EIGRP, and OSPF protocols.
12. Compare and contrast classful and classless IP addressing and behaviors in routed networks.
13. Design and implement a classless IP addressing scheme for a given network.
14. Apply configuration commands with routers implementing EIGRP and OSPF.
15. Configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small routed network.
16. **Apply router commands to troubleshoot common errors that occur in local area networks.**
17. **Explain basic switching concepts and the operation of Cisco switches.**
18. Describe how VLANs create logically separate networks and how routing occurs between them.
19. **Configure, verify and troubleshoot VLANs, trunking, interVLAN routing, VTP, and RSTP**
20. Verify network status and switch operation using basic utilities such as ping, trace-route, Telnet, Address Resolution Protocol (ARP), and ipconfig.
21. Identify, prescribe, and resolve common switched network media issues, configuration issues, autonegotiation, and switch hardware failures.
22. **Manage IOS software and configuration files.**
23. **Configure and troubleshoot NAT and DHCP.**

Connections

- Post-Secondary: KCTCS CIT 167 Routing Protocols and Concepts
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

LAN Switching and Wireless/Scaling Networks – Cisco III
Valid Course Code
110904

Course Description:

This course provides students with the skills necessary to understand and apply advanced networking concepts. Covers local area network (LAN) switching, virtual local area networks (VLANS), advanced network design concepts, advanced router configuration and advanced network management projects. Completes one of a series of four courses that helps prepare students for the Cisco Certified Network Associate (CCNA) certification exam and the Cisco Certified Entry Networking Technician (CCENT). (This is the third course in the Cisco Curriculum.)

Content/Process

Students Will:

1. Identify and correct common network problems at layers 1,2,3, and 7 using a layered model approach.
2. Interpret network diagrams.
3. Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts.
4. Explain the technology and media access control method for Ethernet networks.
5. Describe standards associated with wireless media, such as IEEE WI-FI Alliance and ITU/FCC.
6. Identify basic configuration and implementation parameters on a wireless network to ensure that devices connect to the correct access points with minimal interference.
7. Compare and contrast Wi-Fi Protected Access (WPA) security features and capabilities of open, Wired Equivalent Privacy (WEP), and WPA-1/2 networks.
8. Perform, verify, and troubleshoot switch configuration tasks from a console and by remote access including initial configuration, VLANs, VLAN Trunking Protocol (VTP), Spanning Tree Protocols (STP, RSTP, PVSTP), and interVLAN routing.
9. Apply configuration commands implementing OSPF and EIGRP.
10. Manage Cisco IOS® Software, licensing, and configuration files.
11. Identify and describe the purpose and configuration of the components in a small wireless network, such as Service Set Identification (SSID), Basic Service Set (BSS), and Extended Service Set (ESS).

Connections
- Post-Secondary: KCTCS CIT 209 LAN Switching and Wireless
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Accessing the WAN/Connecting Networks – Cisco IV
Valid Course Code
110905

Course Description:
Provides students with the skills necessary to understand and apply advanced principles and applications in deploying networking hardware. Covers WAN design, WAN connectivity protocols such as PPP, xDLS, and Frame Relay, as well as advanced network management projects. Completes one of a series of four courses that helps prepare students for the Cisco Certified Network Associate (CCNA) certification exam and the Cisco Certified Entry Networking Technician (CCENT). (This is the fourth course in the Cisco Curriculum.)

Content/Process

Students Will:

1. Identify and correct common network problems at OSI layers 1, 2, 3, and 7 using a layered model approach.
2. Interpret network diagrams including selection of appropriate infrastructure materials.
3. Explain the technology and media access control method for Ethernet networks.
4. Use the command line interface and Windows© utilities to troubleshoot common errors that occur in switched networks.
5. Manage Cisco IOS® Software and configuration files.
6. Configure and troubleshoot WAN technologies including Frame Relay and PPP.
7. Use of monitoring tools such as Syslog, SNMP, and Netflow.
8. Implementing and troubleshoot VPNs.

Connections
- Post-Secondary: KCTCS CIT 212 Accessing the WAN
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Cisco CCNA Certification/CCENT Certification
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Course Description: Introduces the skills to install home and small office networks. Develop skills needed by network technicians, computer technicians, cable installers, and help desk technicians. Provides a hands-on introduction to networking and the Internet using tools and hardware commonly found in home and small office environments.

Content/Process

Students Will:

1. Configure a personal computer system, including the operating system, interface cards, and peripheral devices for use on a network.
    a. Personal computers and applications
    b. Types of computers
    c. Binary representation of data
    d. Computer components and peripherals
    e. Computer system components
    f. Choosing the operating system
    g. Installing the operating system
    h. Managing the operating system
2. Plan and install a small network connecting to the Internet.
    i. The Internet and how we connect to it.
    j. Sending information across the Internet
    k. Networking devices in a NOC
    l. Cables and connectors
    m. Working with twisted pair
    n. Introduction to networking
    o. Principles of communication
    p. Communicating on a local wired network
    q. Building the access layer of an Ethernet network
    r. Building the distribution layer of a network
    s. Plan and connect a local network
    t. Sending information across the Internet
    u. Networking devices in a NOC
    v. Cables and connectors
    w. Working with twisted pair
3. Share resources such as files and printers among multiple computers.
    a. Share files
    b. Share printers
4. Troubleshoot network and Internet connectivity.
    c. Troubleshooting process
    d. Troubleshooting issues
    e. Common issues
    f. Troubleshooting and the help desk
5. Recognize and mitigate security threats to a small network.
    g. Networking threats
    h. Methods of attack
    i. Security policy
    j. Using firewalls

6. Configure and verify common Internet applications.
    a. Clients/servers and their interaction
    b. Application protocols and services
    c. Layered model and protocols
7. Configure basic Internet protocol (IP) services using a graphical user interface (GUI)
    a. IP addressing and subnet masks
    b. Types of IP addresses
    c. How IP addresses are obtained
    d. Address management

Connections

- Post-Secondary: KCTCS CIT 162 Home and Small Office Networks
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills
- Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Small to Medium Business Networks
Valid Course Code
110909

Course Description: Prepares students for jobs as network technicians. Develops additional skills required for computer technicians and help desk technicians. Provides a basic overview of routing and remote access, addressing, security, and covers servers that provide e-mail services, Web space, and authenticated access.

Content/Process

Students Will:

1. Describe the structure of the Internet and how Internet communications occur between hosts.
   a. What is the Internet?
   b. Internet service providers
   c. ISP connectivity
2. Install, configure, and troubleshoot Cisco IOS® devices for Internet and server connectivity.
   a. Enabling routing protocols
   b. Configure initial router configuration using IOS CLI
3. Plan a basic wired infrastructure to support network traffic.
   a. Describe common LAN issues
   b. Plan the Addressing Structure in the LAN, NAT and PAT
4. Implement basic WAN connectivity using Telco services.
5. Demonstrate proper disaster recovery procedures and perform server backups.
6. Monitor network performance and isolate failures.
7. Troubleshoot problems using an organized, layered procedure.
   a. Troubleshooting methodologies and tools
   b. Troubleshooting Layer 1 and 2 issues
   c. Troubleshooting Layer 3 IP addressing issues
   d. Troubleshooting Layer 3 routing issues
   e. Troubleshooting Layer 4 and upper layer issues.
8. Describe the OSI model and the process of encapsulation.

Connections
- Post-Secondary: KCTCS CIT 163 Small to Medium Business Networks
- CTSO's – SkillsUSA, FBLA ((STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills
- Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Introduction to Routing and Switching
Valid Course Code
110910

Course Description: Familiarizes students with the equipment applications and protocols installed in enterprise networks, with a focus on switched networks, IP Telephony requirements, and security. Introduces advanced routing protocols such as Enhanced Interior Gateway Routing Protocol (EIGRP) and Open Shortest Path First (OSPF) Protocol.
Content/Process

Students Will:

1. Implement a LAN for an approved network design.
   a. Networking in the Enterprise
      i. Describing the enterprise network
      ii. Identifying enterprise applications
      iii. Supporting remote workers
   b. Exploring the Enterprise Network Infrastructure
      i. Describing the current network
      ii. Supporting the enterprise edge
      iii. Reviewing CISCO routing and switching
2. Configure a switch with VLANs and inter-switch communication.
   a. Switching in an Enterprise Network
      i. Using switches
      ii. Preventing switching loops
      iii. Configuring VLANS
      iv. Managing VLANS on switches
      v. Configuring Inter-VLAN Routing
3. Implement access lists to permit or deny specified traffic.
   a. Filtering Traffic Using Access Control Lists
      i. Using access control lists
      ii. Using a Wildcard Mask
      iii. Configuring access control lists
      iv. Permitting and denying specific types of traffic
      v. routing with access control lists
4. Implement WAN links.
   a. Addressing in an Enterprise Network
      i. Using a hierarchical IP network address scheme
      ii. Using VLSM
      iii. Using classless routing and CIDR
      iv. Using NAT and PAT
   b. Routing with a Distance Vector Protocol
      i. Managing enterprise networks
      ii. Routing using the RIP protocol
      iii. Routing using the EIGRP
   c. Implementing Enterprise WAN Links
      i. Connecting the enterprise WAN
      ii. Common WAN encapsulations
      iii. Configuring PPP WAN serial links
5. Configure routing protocols on Cisco devices.
   a. Routing with a Link-State Protocol
      i. Routing using the OSPF protocol

     ii. Implementing single-area OSPF
     iii. Using multiple routing protocols
6. Perform LAN, WAN, and VLAN troubleshooting using a structured methodology and the OSI model.
   a. Troubleshooting an Enterprise Network
     i. Understanding the impact of network failure
     ii. Troubleshooting switching and connectivity issues
     iii. Troubleshooting routing issues
     iv. Troubleshooting WAN configurations
     v. Troubleshooting access control list issues

Connections

Course Description: Provides a student with the organizational and technical skills necessary for gathering network requirements, designing basic networks, establishing proof-of-concept, and performing project management tasks through a variety of case studies and role-playing exercises. Presents lifecycle services, including upgrades, competitive analyses, and system integration in the context of pre-sale support.

Content/Process

Students Will:

1. Gather customer requirements.
   b. Introducing Network Design Concepts
      i. Discovering network design basics
      ii. Investigating core layer design considerations
      iii. Investigating distribution layer considerations
      iv. Investigating access layer design considerations
      v. Investigating server farms and security
      vi. Investigating wireless network considerations
      vii. Supporting for WANs and remote workers
   c. Gathering Network Requirements
      i. Introduction Cisco lifecycle services
      ii. Explaining the sales process
      iii. Preparing for the design process
      iv. Identifying technical requirements and constraints
      v. Identifying manageability design considerations
   d. Characterizing the Existing Network
      i. Documenting the existing network
      ii. Updating the existing IOS
      iii. Upgrading existing hardware
      iv. Performing a wireless site survey
      v. Documenting network design requirements
2. Design a simple Internetwork using Cisco technology
   a. Identifying Application Impacts on Network Design
      i. Characterizing network applications
      ii. Explaining common network applications
      iii. Introducing Quality of Service (QoS)
      iv. Examining voice and video options
      v. Documenting applications and traffic flows
   b. Creating the Network Design
      i. Analyzing the requirements
      ii. Selecting the appropriate LAN topology
      iii. Designing the WAN and remote worker support
      iv. Designing wireless networks
      v. Incorporating security
3. Design an IP addressing scheme to meet LAN requirements
   a. Using IP Addressing in the Network Design
      i. Creating an appropriate IP addressing design
      ii. Creating the IP address and naming structure
      iii. Describing IPv4 and IPv6

4. Create an equipment list to meet LAN design requirements.
5. Create and present a proposal to a customer.
    a. Preparing the Proposal
        i. Assembling the existing proposal information
        ii. Developing the implementation plan
        iii. Planning the installation
        iv. Creating the presentation proposals
6. Install and configure a prototype Internetwork.
    a. Prototyping the Campus Network
        i. Building a prototype to validate a design
        ii. Prototyping the LAN
        iii. Prototype the server farm
    b. Prototyping the WAN
        i. Prototyping remote connectivity
        ii. Prototyping WAN connectivity
        iii. Prototyping remote worker support
7. Obtain and upgrade Cisco IOS software in Cisco devices.

Connections

- Post-Secondary: KCTCS CIT 165 Network Design and Support
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills
- Nationally Recognized Industry Standards and Certifications – refer back to pathway document

Help Desk Operations I
Valid Course Code
110102

Course Description: Introduces a variety of tools and techniques to provide user support in help desk operations. Explores help desk concepts, customer service skills, troubleshooting problems, writing for end users, help desk operations and software, needs analysis, facilities management, and other topics related to end user support.

Content/Process

Students will:

1. Define the role of help desk and customer service in an organization.
   a. Introduction to Help Desk Service Tools, Technology, and Techniques.
   b. How organizations provide user support
   c. Types of support tools - software and hardware
   d. Troubleshooting techniques
   e. Common support problems
2. Evaluate help desk technology, tools and techniques.
   a. Developing Soft Skills for Achieving End-User Satisfaction
   b. Delivering quality computer user support
   c. Active listening and communications with customers
   d. Creating a positive telephone image and skills
   e. Technical writing skills for support professionals
   f. Managing and disseminating information
   g. Handling difficult customer situations
3. Identify common support problems, including software tools and features.
   a. User support Needs Analysis, Evaluation, and Assessment.
   b. Basic strategies to perform user needs analysis and assessment
   c. Major steps analysis undertake to analyze and assess a user's needs
   d. Common tools that aid support specialists in a user needs analysis project
   e. How product and support standards emerged
   f. Common tools and methods support specialists use to evaluate and select computer products
4. Identify service technology trends.
   a. Help Desk and computer Facilities Operation
   b. Typical help desk organization and the incident management process
   c. Hardware and software incident management tools
   d. changes and trends in help desk environments
   e. Major types of computer facilities and common facilities management problems.
   f. User support management
5. Demonstrate professional and effective communication skills.
6. Demonstrate team building strategies.
7. Develop technical training materials, and other user documentation to support help desk operations.
   a. Training Support Users
   b. Goals of training activities
   c. Steps in the training process
   d. How to plan, prepare, and present a training session

     e.   Writing for End Users a. Types of documentation

     f.   Document planning c. Technical writing strategies

8. Demonstrate a methodical approach to the problem-solving process.
9. Apply conflict resolution techniques and skills in customer support.
10. Exhibit positive professionalism with customers and technical writing skills.
11. Demonstrate personal, system, and stress management by way of using self-help tools.
12. Use support performance and reporting tools, call management software, problem resolution software, asset and change management tools, and notification tools for support in additional level two and level three support tools.

Connections

- Post-Secondary KCTCS CIT-232 Help Desk Operations
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Course Description:
Covers installation and configuration of Microsoft Windows client and server operating systems. Helps prepare students for exams in the Microsoft certification exam series.

Content/Process

Students Will:

1. Install and upgrade client and server operating system.
2. Automate a Windows operating system installation.
3. Configure and manage hardware through the Windows operating system.
4. Configure and manage disks and partitions.
5. Configure and manage file systems.
6. Configure and troubleshoot the boot process.
7. Configure the desktop environment.
8. Configure and support Transmission Control Protocol/Internet Protocol (TCP/IP).
9. Provide access to network resources and support remote users.
10. Configure and manage mobile computing.
11. Monitor and optimize operating system performance and resource usage.
12. Implement disaster protection.
13. Create and manage user accounts and groups.
14. Implement operating system security.
15. Configure printing and print services.

I. Installing or Upgrading Windows Operating Systems
    A. Preparing for installation
    B. Installing Windows client
    C. Installing Windows server
    D. Upgrading Windows client or server
    E. Resolving setup failures

II. Configuring the Windows Environment
    A. Managing hardware
    B. Configuring display settings
    C. Changing startup and recovery options
    D. Multilingual support and accessibility options
    E. Environmental variables
    F. Power management

III. Connecting Windows to Networks and Internet
    A. Overview of Windows connectivity
    B. Connecting to a Microsoft network
    C. Connecting to the internet
    D. Resolving connectivity issues

IV. Creating and Managing User Accounts
    A. Introduction to user accounts
    B. Requirements for new user accounts
    C. Creating a user account
    D. Customizing user settings with user profiles
    E. Managing user home folders

V. Managing Access to Resources by Using Groups

Connections
• Post-Secondary: KCTCS CIT 213 MS Client/Server Config • CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review) • Kentucky Occupational Skill Standards • Secretary's Commission on Achieving Necessary Skills (SCANS) • Common Core State Standards ELA and Math • 21st Century Skills

Course Description:
Introduces basic computer and network security concepts and methodologies. Covers principles of: security; compliance and operational security; threats and vulnerabilities; network security; application, data, and host security; access control and identity management; and cryptography.

Content/Process

Students Will:

1. Explain basic security concepts.
2. Identify and explain appropriate use of security tools to facilitate security.
3. Evaluate current security issues related to computer and network systems.
4. Evaluate and select appropriate incident response procedures, disaster recovery, and risk identification techniques to ensure business continuity.
5. Differentiate various malware and systems security threats against computers and networks.
6. Explain the vulnerabilities and mitigations associated with computers and network devices.
7. Explain the proper use of common tools for carrying out vulnerability assessments.
8. Identify and describe potential application and data vulnerabilities, including buffer overflow, DLL injection, and SQL injection.
9. Explain how host firewalls, malware protection, and updates are important to application and data security.
10. Describe the importance of user accounts and associated permissions.
11. Compare and discuss logical and physical access control security methods.
12. Explain authentication models and identify components of each model.
13. Summarize and explain general cryptography concepts.
14. Demonstrate public and private key pairs for digital signing and encryption/decryption.

I. Principles of Security
    A. Physical security
    B. Environmental security
    C. Information security
    D. Personnel security
    E. Network security
II. Compliance and Operational Security
    A. Risks and mitigation strategies
    B. Disaster recovery and incident response procedures
    C. Security awareness
    D. Business continuity and environmental controls
    E. Confidentiality, integrity, and availability (CIA)

III. Threats and Vulnerabilities
    A. Malware awareness
    B. Computer, social engineering, and application attacks
    C. Deterrent techniques

D. Security threats discovery techniques
E. Penetration testing versus vulnerability scanning
IV. Network Security
    A. Security functions
    B. Administration principles
    C. Network design elements
    D. Common protocols and ports
    E. Wireless networks
V. Application, Data and Host Security
    A. Application and data security importance
    B. Host security procedures
VI. Access Control and Identity Management
    A. Authentication services and functions
    B. Best practices
    C. Access control models
VII. Cryptography
    A. General cryptography concepts
    B. Cryptographic tools
    C. Public key infrastructure
    D. Key and certificate management

Connections

- Post-Secondary: KCTCS CIT 180 Security Fundamentals
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Course Description:

Utilizes current word processing, spreadsheet, database, and presentation application software to solve common technology and business problems. Covers basic features of each software application.

Content/Process

Students Will:

1. Use a productivity software package to create, edit, print, and save documents.
2. Use productivity tools such as spelling and grammar.
3. Apply formatting features such as font, color, margins, headers, and footers.
4. Use tools such as cut, copy and paste within a document and between documents.
5. Create HTML file formats for web publishing.
6. Create new documents using templates and wizards.
7. Use a word processing program to insert and use table features.
8. Use a word processing program to insert and use table column features.
9. Insert pictures and Clipart into word processing documents.
10. Use a spreadsheet package to create common business reports and budgets.
11. Use mathematical formulas and common statistical, date, financial, and logical functions.
12. Make formatting changes to a worksheet including column width, row height, cell, and table formatting.
13. Use autofill to copy and paste formulas and repeat patterns.
14. Create effective charts, including bar, line, and pie charts, to accompany business reports.
15. Use a relational database management program to create tables, queries, forms, reports, and labels.
16. Use query feature to extract information from a database using simple and compound conditions.
17. Use relationship feature to join tables in a database and obtain information from multiple tables.
18. Plan and create an electronic slide show presentation using a presentation software package.
19. Use timing, transition, and animation features to enhance a presentation.

I. Productivity Software
   A. Create
   B. Edit
   C. Print
   D. Save
   E. Spelling
   F. Grammar
   G. Formatting features
      1. Font
      2. Color
      3. Margins
      4. Headers and footers

        5. Design styles and themes

        6. Page orientation

   I. Cut

   J. Copy

   K. Paste

   L. Save as HTML format

   M. Create, edit, and use templates

   N. Wizards

II. Word Processing

   A. Tables

   B. Columns

   C. Pictures and Clipart

III. Spreadsheet

   A. Common business reports and budgets

   B. Mathematical formulas

   C. Statistical, date, financial and logical functions

   D. Formatting

        1. Column width

        2. Row height

        3. Cell and table formatting.

   E. Autofill

   F. Charts

        1. Bar

        2. Line

        3. Pie

IV. Database management

   A. Tables

   B. Forms

   C. Reports

   D. Labels

   E. Query

        1. Simple

        2. Compound conditions.

   F. Relationship feature to join tables

V. Presentation

   A. Slide layout

   B. Timing

   C. Transition

   D. Animation

Connections

- Post-Secondary: KCTCS CIT 130 Productivity Software
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Course Description:

Introduces students to fundamental programming concepts using the C++ programming language. Topics include data types, control structures, simple data structures, error-handling, modular programming, and information and file processing.

Content/Process

Students Will:

1. Demonstrate knowledge of the program development life cycle.
2. Design, develop, compile, debug, test, run, and document programs in the C++ language using a software development kit.
3. Design and develop programs using operators and assignments.
4. Design and develop programs using primitive data types.
5. Design and develop programs using sequence, selection, and repetition structures.
6. Design and develop programs using single and multi-dimensional arrays.
7. Design and develop programs using pointers.
8. Design and develop programs using void and value passing function.
9. Design and develop programs using object oriented programming features, including defining classes and instantiating objects.
10. Design and develop programs using effective error and exception handling.
11. Evaluate and critique effectiveness and efficiency of code.

I. Program Development Life Cycle
   A. Steps in the life cycle
   B. Using the life cycle
II. Software Development Tools
   A. Write C++ code
   B. Compile C++ code
   C. Debug C++ code
III. C++ Programming Fundamentals
   A. Keywords
   B. Primitive data types
   C. Variables
   D. Constants
IV. Operators and Assignments
   A. Assignment operators
   B. Comparison operators
   C. Arithmetic operators
   D. Relational operators
   H. Data type casting
V. Control Structures
   A. Sequence
   B. Selection

   C. Repetition
  VI. Functions
   A. Void
   B. Value passing
  VII. Arrays and Pointers
   A. Pointers
   B. Single-dimension arrays
   C. Multi-dimension arrays
  VIII. Errors
   A. Types of errors
   B. Exception handling
  IX. Structured Programming
   A. User-defined functions
   B. Modular programming
  X. Object-Oriented Anatomy
   A. Classes
   B. Objects
   C. Instantiation
   D. Arrays of objects
  XI. Evaluation of Programming
   A. Effectiveness of code
   B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 142 C++ I
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Course Description:
Provides students with a study of traditional and emerging Internet technologies. Covers topics including Internet fundamentals, Internet applications, Internet delivery systems, and Internet client/server computing. Provides a hands-on experience and some programming in an Internet environment.

Content/Process

Students Will:

1. Describe the history of the Internet and its impact on government, society, and business.
2. Describe the models used to organize Internet technologies.
3. Explain how the Internet is governed and the standards that are used.
4. Describe the protocols that make the Internet work.
5. Use Internet technologies for data transfer, remote access, information delivery, email, content presentation, and real-time collaboration.
6. Describe how the Internet is used for e-commerce.
7. Describe Internet naming conventions, URLs, and web server file organization.
8. Describe core connectivity issues such as NAT, ISPs, and IP addresses.
9. Create and publish simple web content using basic HTML(Hypertext Markup Language).
10. Use existing scripting applications and create simple client/server applications to enhance information delivery.

   I. History of the Internet
      a. DARPA
      b. ARPANET
      c. TCP/IP
      d. RFCs (Requests For Comments)
      e. WWW (World Wide Web)
   II. Internet Organization and Governing Bodies
      a. World Wide Web Consortium (W3C)
      b. NIC, InterNIC, IANA, and ICANN
      c. Truth in Domain Names Act
      d. PROTECT Act of 2003
   III. Internet Technologies
      a. FTP
      b. Remote Access
      c. Email
      d. Blogs
      e. Twitter
      f. Wikis
      g. Multimedia
      h. Streaming video
      i. Video conferencing
      j. News groups
      k. Data feeds
      l. Listservs
      m. Podcasts
      n. Encryption

IV. E-commerce
- a. Describe e-commerce and how it can be used
- b. Describe how serach engines are used to market web sites
- c. Explain how search results can be influenced
- d. Online shopping and securtity (SSL and certificates)

V. Creating and Registering a Web Site
- a. Obtaining a domain name
- b. Common web servers and services
- c. Web server organization

VI. Creating and Publishing Web Content
- a. HTML usage
- b. HTML tags
- c. Creating a web page
- d. Web site organization
- e. Publishing a web page

VII. VII. Client-side and Server-side Programming
- a. Client-side programming using JavaScript or other client-side programming language
- **b.** Server-side programming using ASP, PHP, Perl, or other server-side programming language

Connections

- Post-Secondary: KCTCS CIT 150 Internet Technologies
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

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Java I
Valid Course Code
110205

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Course Description:

Introduces students to fundamental programming concepts using the Java programming language. Topics include data types, control structures, simple data structures, error-handling, object-oriented programming, graphical user interfaces, and modular programming**.**

<div align="center">

Content/Process

</div>

Students Will:
1. Design, develop, compile, debug, test, run, and document programs in the Java language using a software development kit.
2. Design and develop programs using operators and assignments.
3. Design and develop programs using primitive data types.
4. Design and develop programs using sequence, selection, and repetition structures.
5. Design and develop programs using single and multi-dimensional arrays.
6. Design and develop programs using effective error and exception handling.
7. Design and develop programs using object oriented programming features, including defining classes, instantiating objects, and using arrays of objects.
8. Design and develop programs implementing user-defined methods and modular programming.
9. Design and develop programs using method overloading.
10. Design and develop programs using inheritance, encapsulation, and polymorphism.
11. Design and develop GUI interfaces for Java applications.
12. Evaluate and critique effectiveness and efficiency of code.

I. Software Development Tools
   A. Write Java code
   B. Compile Java code
   C. Debug Java code
II. Java Programming Fundamentals
   A. Keywords
   B. Primitive data types
   C. Variables
   D. Constants
III. Operators and Assignments
   A. Assignment operators
   B. Arithmetic operators
   C. Relational operators
   D. Logical operators
   E. Compound operators
   F. Data type casting
IV. Programming Structures
   A. Sequence
   B. Selection
   C. Repetition
V. Arrays
   A. Single-dimension arrays
   B. Multi-dimension arrays

VI. Errors
  A. Types of errors
  B. Exception handling
VII. Object-Oriented Anatomy
  A. Classes
  B. Objects
  C. Instantiation
  D. Arrays of objects
VIII. Structured Programming
  A. User-defined functions
  B. Modular programming
IX. Advanced Features
  A. Overloading operators
  B. Overloading methods
  C. Polymorphism
  D. Inheritance
  E. Encapsulation
X. Graphical User Interfaces
  A. Frames and panels
  B. GUI components
  C. GUI design
  D. GUI listeners
XI. Evaluation of Programming
  A. Effectiveness of code
  B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 149 Java-I
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Course Description:
Provides students with an extensive overview of designing and developing advanced object-oriented applications using the Java programming language. Topics include input and output streams (file processing), polymorphism, inheritance, multithreading, recursion, mobile computing, and other advanced topics.

Content/Process

Students Will:

1. Design and develop programs that use advanced GUI components.
2. Design and develop programs that use input and output streams including character and binary streams.
3. Design and develop programs that use multithreading.
4. Design and develop programs that use polymorphism.
5. Design and develop programs that use inheritance.
6. Design and develop programs that use recursion.
7. Design and develop programs that introduce mobile application concepts.
8. Design and develop programs that incorporate other advanced features of Java programming.
9. Evaluate and critique effectiveness and efficiency of code.

   I. Advanced GUI Components
      A. Layout and layout managers
      B. Swing components
  II. Input and Output
      A. Stream concepts
      B. Character streams
      C. Binary streams
  III. Threads
      A. Definition
      B. Purpose
      C. Implementation
      D. Multithreading versus multiprocessing
  IV. Polymorphism
      A. Definition
      B. Purpose
      C. Implementation
  V. Inheritance
      A. Definition
      B. Purpose
      C. Implementation
  VI. Recursion
      A. Recursive algorithms
      B. Recursion versus Iteration
  VII. Mobile Applications
      A. Mobile computing concepts
      B. Creation of mobile applications
  VIII. Advanced Java

A. Advanced Java functions and features
B. Incorporating other Java functions and features
IX. Evaluation of Programming
A. Effectiveness of code
B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 249 Java-II
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Visual Basic I
Valid Course Code
110207

Course Description:
Introduces students to fundamental programming concepts using the Visual Basic programming language. Topics include data types, control structures, simple data structures, error-handling, modular programming, event-driven programming, graphical user interfaces, and file processing.

Content/Process

Students Will:

1. Demonstrate knowledge of the program development life cycle.
2. Design, develop, compile, debug, test, run, and document event-drive programs in the Visual Basic programming language.
3. Design and develop programs using operators and assignments.
4. Design and develop programs using primitive data types.
5. Design and develop programs using sequence, selection, and repetition structures.
6. Design and develop programs using single and multi-dimensional arrays.
7. Demonstrate knowledge of file processing in Visual Basic.
8. Demonstrate knowledge of object oriented programming features in Visual Basic.
9. Design and develop programs using effective error and exception handling.
10. Evaluate and critique effectiveness and efficiency of code.

I. Program Development Life Cycle
    A. Steps in the life cycle
    B. Using the life cycle

II. Software Development Tools
    A. Write event-driven Visual Basic code
    B. Compile Visual Basic code
    C. Debug Visual Basic code

III. Programming Fundamentals
    A. Keywords
    B. Primitive data types
    C. Variables
    D. Constants

IV. Operators and Assignments
    A. Assignment operators
    B. Comparison operators
    C. Arithmetic operators
    D. Relational operators
    E. Conversion between data types

V. Control Structures
    A. Sequence
    B. Selection
    C. Repetition

VI. Arrays
    A. Single-dimension arrays
    B. Multi-dimension arrays

VII.   File Processing
- A.   File formats
- B.   Reading from and writing to files

VIII.   Errors
- A.   Types of errors
- B.   Exception handling

IX.   Structured Programming
- A.   User-defined functions
- B.   Modular programming

X.   Object-Oriented Anatomy
- A.   Classes
- B.   Objects
- C.   Instantiation

XI.   Evaluation of Programming
- A.   Effectiveness of code
- B.   Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 148 Visual Basic I
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Visual Basic II: Creating Desktop Applications
Valid Course Code
110208

Course Description:

Provides students with an extensive overview of designing advanced computer applications using the
Visual Basic programming language. Topics include graphical user interfaces, event-driven programming,
modular programming, object-oriented programming, advanced data types and structures, input validation,
error-handling, and file and database processing.

Content/Process

Students Will:
1. Design and develop an event-driven application, including a well-designed user interface.
2. Demonstrate understanding of modular design.
3. Demonstrate understanding of object-oriented programming.
3. Design and code applications using advanced data types and structures.
4. Implement input validation and processing.
5. Demonstrate error-checking and error handling.
6. Implement file and database processing.
7. Evaluate and critique effectiveness and efficiency of code.

I. Application design
   A. Using the Microsoft Solutions Framework (MSF)
   B. Designing a system architecture
   C. VB.NET fundamentals
   D. The Visual Studio.NET integrated development environment
   E. Event-driven design
   F. Graphical user interfaces
II. Advanced Design
   A. User interface design principles
   B. Managing forms
   C. Using controls
   D. Using menus
III. Modular Programming
   A. Designing modules
   B. Creating modules
   C. Reusable modules and code
IV. Object-Oriented Programming
   A. Classes
   B. Objects
   C. Instantiation
   D. Inheritance
   E. Class libraries
V. Advanced Data Types and Structures
   A. Enumerated and structure data types
   B. Collections
VI. Validating and Processing User Input
   A. Overview of validation
   B. Implementing form-level validation
   C. Implementing field-level validation
VII. Error Handling
   A. Creating an error handler
   B. In-line error handling
   C. Centralized error handling

VIII. File and Database Processing
    A. File formats
    B. Database access
    C. SQL with Visual Basic
    D. Creating data sets
    E. Web forms
IX. Evaluation of Programming
    A. Effectiveness of code
    B. Efficiency of code

Connections

- Post-Secondary: KCTCS CIT 248 Visual Basic II
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Information Technology Co-op
Valid Course Code
110918

Course Description:

Cooperative Education for CTE courses provide supervised work site experience related to the student's identified career pathway. A student must be enrolled in an approved capstone course during the same school year that the co-op experience is completed. Students who participate receive a salary for these experiences, in accordance with local, state and federal minimum wage requirements according to the Work Based Learning Guide.

Content/Process

Students will:

1. Demonstrate and practice safe work habits at all times.
2. Gain career awareness and the opportunity to test career choice(s)
3. Receive work experience related to career interests
4. Integrate classroom studies with work experience
5. Receive exposure to facilities and equipment unavailable in a classroom setting
6. Increase employability potential

Connections

- Post-Secondary: KCTCS CIT 199
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Information Technology Internship
Valid Course Code
110919

Course Description:

Internship for CTE courses provide supervised work-site experience for high school students who are enrolled in a capstone course associated with their identified career pathway. Internship experiences consist of a combination of classroom instruction and field experiences. A student receiving pay for an intern experience is one who is participating in an experience that lasts a semester or longer and has an established employee-employer relationship. A non-paid internship affects those students who participate on a short-term basis (semester or less). All information referenced to the Work Based Learning Guide.

Content/Process

Students will:
7. Demonstrate and practice safe work habits at all times.
8. Gain career awareness and the opportunity to test career choice(s)
9. Receive work experience related to career interests
10. Integrate classroom studies with work experience
11. Receive exposure to facilities and equipment unavailable in a classroom setting
12. Increase employability potential

Connections
- Post-Secondary: KCTCS CIT 290
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Course Description:

This course is designed to assist students with developing skills needed to be successful leaders and responsible members of society. This student will develop personal attributes and social skills. Emphasis will be placed on interpersonal skills, team building, communication, personal development and leadership. This course will include opportunities for students to apply their knowledge.

Content/Process

Students will:

1. Investigate types of leadership and determine personal style.
2. Compare and contrast positive and negative characteristics of leaders.
3. Identify the role of leadership in the global society.
4. Assess the role that qualified leaders have on the success of organizations.
5. Explain how cultural and social diversity and equity impact leadership skills.
6. Identify and explain the importance of team membership skills for individuals and groups.
7. Develop interpersonal skills for resolving conflicts that occur in the home, school, community and workplace.
8. Demonstrate verbal and nonverbal communication skills needed for personal and leadership roles.
9. Make informed decisions using decision-making process.
10. Demonstrate appropriate parliamentary procedure skills used in meetings.
11. Analyze leadership opportunities available in school and community.
12. Describe how ethical and social behaviors affect individuals.
13. Develop personal goals.
14. Demonstrate appropriate business, professional and social etiquette.
15. Analyze the role self-management has on use of time and stress.

Connections

- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Introduction to Digital 3D Game Graphics
Valid Course Code
113601

Course Description:

Emphasizes creating 3D graphics using one or more state-of-the-art software packages. Provides students with a thorough understanding of techniques for designing advanced 3D games and simulations. Courses will cover 2D and 3D graphics, animation, character development, texturing, rigging, scripting and game setup using state-of-the-art software development tools.

Content/Process

Students Will:

1.   Maneuver various menus and tools in a 3 Dimensional software package.
2.   Create Three Dimensional Objects.
3.   Create Lines and Curves in 3Dimensional software.
4.   Create Three Dimensional Polygons and Advanced Objects.
5.   Create and apply Materials and Textures for realistic objects and surfaces.
6.   Demonstrate skills in applying cameras and adjusting lighting in 3 Dimensional objects and surfaces.
7   Demonstrate animating simple 3 Dimensional Objects.

I.   Interface
    A.   Menus
    B.   Panels
    C.   Toolbars
    D.   Command line
    E.   Animation controls
    F.   Hiding toolbars
    G.   Displaying hidden toolbars
    H.   Help menu
II.   Objects
    A.   Creating
    B.   Selecting
    C.   Moving
    D.   Rotating
    E.   Scaling
    F.   Modifying
    G.   Pivot points
    H.   Aligning
    I.   Positioning

III. Lines and curves
    A.   Creating
    B.   Editing
    C.   Vertices
    D.   Creating shapes

IV. Polygons
    A.   Creating
    B.   Editing
    C.   Altering
    D.   Subdividing

V. Materials and textures
    A.   Understanding
    B.   Applying
    C.   Editing
    D.   Painting
    E.   Shadowing

VI. Cameras and lights
    A.   Working with cameras
    B.   Positioning cameras
    C.   Working with lights
    D.   Adjusting light settings
    E.   Creating light effects

VII. Introduction to animation
    A.   Key frames
    B.   Motion paths
    C.   Animation curves
    D.   Controlling

Connections

- Post Secondary: KCTCS: DGD 132
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Digital Applications, Texturing & Special Effects (Photoshop)
Valid Course Code
113602

Course Description:

Introduces the techniques for creating textures and lighting
for 3D games and simulations.

Content/Process

Students Will:

1. Demonstrate an understanding of how to move between tools and menus in 3D modeling software.

2. Understand and create work between 2D and 3D scenes.

3. Create textures for the 3D environment in unique and innovative team and personal designs.

4. Demonstrate an understanding of adding simple lights to scene.

5. Demonstrate an understanding of adding simple shadows to textures.

6. Manipulate a simple 3D camera for use with designs.

I.   Work Area

    A. Becoming familiar with the interface
    B. Tools
    C. Palettes
    D. Menus

II.   3D World

    A. Understanding the 3D environment
    B.   Concepts and terms
III.   3D Files
    A.   3D file formats
    B.   Importing objects
    C.   Meshes

IV.   3D Painting and textures
    A.   2D versus 3D textures
    B.   Creating textures
    C.   Painting textures on objects
V.   3D Objects
    A.   Shapes

    B.   2D meshes versus 3D meshes

VI.   Lights
    A.   Types of lights
    B.   Choosing the right light
    C.   Creating and applying lighting
VII.   3D Camera
    A.   Views

    B.   Manipulating

    C.   Customizing

VIII.   Rendering
    A.   Render settings

    B.   Render options

Connections

- Post Secondary: KCTCS: DGD 131
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Digital 3D Graphics II – Texturing & Special Effects II
Valid Course Code
113604

Course Description:

Introduces advanced texturing and lighting techniques to enhance depth perception and realism within 3D environments.

Content/Process

Students will:

1. Demonstrate an understanding of how to add textures to objects.

2. Use appropriate types of lighting techniques to designs.

3. Demonstrate adding depth using different types of shadowing techniques.

4. Create custom connections and color utilities to innovative designs.

5. Use indirect and direct illumination to designs.

6. Implement ray tracing using mental ray to individual and team designs.

I.   Textures
    A.   Shaders
    B.   Types of materials
    C.   Maps
    D.   Texture mapping
    E.   Planar mapping
    F.   Procedural mapping
    G.   Layering

II. Lighting
    A.   Types
    B.   Linking and unlinking
    C.   Light Fog
    D.   Light Glow

III. Shadows
    A.   Depth maps
    B.   Raytracing
    C.   Linking and unlinking shadows

Connections

- Post Secondary: KCTCS: DGD 231
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

3D Digital Game Character Development
Valid Course Code
113603

Course Description:

Develop realistic 3D characters with complete body structure.

Content/Process

Students will:

1. Discuss the preparation and the limitations associated with creating 3D characters.

2. Scan a drawing into a software package in preparation for creating a 3D character.

3. Create the head and facial features of a 3D character.

4. Create the limbs and torso of a 3D character.

5. Create the hair of a 3D character.

6. Create and add clothing for 3D characters.

7. Demonstrate an understanding of adding lighting and textures for realistic detail.

8. Implement and optimize a 3D character for smaller file size.

I. Designing the character

    A. Preparation

    B. Limitations

    C. Research

II. Importing

    A. Scanning a hand drawn sketch

    B. Resizing the sketch

III. Upper body

    A. Head

    B. Face

    C. Ears

    D. Hair

    E. Teeth

    F. Tongue

    G. Eyes

IV. Torso and Limbs

    A. Arms

    B. Legs

    C. Back

    D. Head

    E. Shoulders

V. Clothing

    A. Introduction

    B. Creating clothing

    C. Dressing the character

    D. Separating the clothing from the character

VI. Textures

    A. Preparing the image

    B. Creating textures

    C. Applying textures

    D. Applying shades and lighting

VII. Optimization

    A. Optimization explained

    B. Deciding what to remove

    C. Removing unnecessary parts

    D. Consolidation

Connections

- Post Secondary: KCTCS: DGD 232
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

FLASH with Action Script
Valid Course Code
110810

Course Description:

This course will help students gain knowledge about Flash and apply the fundamental principles for creating video, web sites, and interactive gaming projects. Flash CS4 can be used in this course.

Content/Process

Students Will:

1. Work with Flash Tools and Menus
2. Demonstrate an understanding of Graphics using FLASH
3. Understand and work on Editing Objects
4. Demonstrate usage of Working with Layers
5. Work on Editing and Formatting Text
6. Use the Creating Symbols: Graphic, Movie Clip, and Button in FLASH
7. Use the Creating Buttons in FLASH
8. Demonstrate an understanding of using Animations – Designing and Editing
9. Understand ActionScript in FLASH
10. Use Audio – Acquiring and Editing in FLASH
11. **Demonstrate an understanding for Putting Components Together in FLASH**
12. **Demonstrate how to Publish Flash Files**
13. **Demonstrate Game Design using Flash ActionScript**

Connections

- Post Secondary:
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Special Topics In Computer Science
Valid Course Code
110752

Special Topics in GIS
Valid Course Code
Use 110316

Special Topics in Information Support and Services
Valid Course Code
110152

Special Topics in Networking
Valid Course Code
110952

Special Topics in Programming
Valid Course Code
110252

Special Topics in Web Development & Administration
Valid Course Code
110852

All these courses can be utilized, with justification for course and course objectives, upon approval by Information Technology Consultant Related to Career Major.

Connections

- Post Secondary: KCTCS CIT 299 (GIS only - CIT 229)
- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills

Computer Graphics (Formerly Digital Graphics Technology)
Valid Course Code
110213
Course Description: This course introduces students to the trends, theory and methods of digital media for traditional print and electronic publication, including pixel-based and vector graphics, principles of media design, and conceptualization and translation of ideas into visual form.

Content/Process

Students Will:

1. Identify the principles of communication through visual medium using text, still imagery and video technology
2 Explain copyright laws affecting digital graphics including images and image use.
3 Identify the purpose of, audience, storyboarding and audience needs for preparing image(s)
4 Explain the design process for various forms of digital media
5 Identify considerations of designing for a specific audience, including paid customers
6 Analyze and evaluate digital media content for audience, purpose and design techniques
7 Identify trends in the use and creation of digitally generated media
8 Explain the key elements of drawing and painting
9 Explain image resolution, image size, and image file format for web, video, and print
10 Demonstrate effective message composition and design using industry standard design elements and principles: Design Principles a) Balance b) Emphasis through dominance and influence in an image c) Harmony through complementary layers and/or effects d) Unity of image elements e) Oppostiion through contrasting visual aspects f) Rhythm
11 Task 10 continued Design Elements a) Perspective/3D/Depth/Space b) Color c) Font d) Proportion e) Layers f) Light and Shadow g) Line h) Shape i) Form/Volume j) Texture k) Layout l) Value/Tone m) Motion
12 Explain the principles of image composition a. Rule of Thirds b. Golden Section Rule c. Diagonal Rule
13 Explain digital typography.
14 Differentiate between typeface and font.
15 Demonstrate digital camera and scanner operation
16 Define digital image terminology
17 Explain image and editing layers.
18 Demonstrate importin, exporting, organizing, and saving digital graphic files.
19 Manipulate image selections and measurement.
20 Use digital graphic editing software guides and rulers.
21 Transofrm digital images using editing applications.
22 Adjust or correct the tonal range, color, or distortions of an image using editing applications.
23 Explain retouching and blending images
24 Explain and apply digital image editing filters.
25 Prepare images for web, print, and video
26 Identify career and entrepreneurial opportunities in digital graphics technology.

Connections

- Kentucky Occupational Skill Standards
- CTSO's – SkillsUSA, FBLA (STLP encouraged even though not a recognized student organization for program review)
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- Common Core State Standards ELA and Math
- 21st Century Skills